



VOSH Program Directive: 02-210

Issued: March 5, 1990

Subject: Excavation and Trench Procedure and Interpretations Manual

A. Purpose.

This directive establishes procedures for enforcement of the new Excavation and Trenching Standard, § 1926 Subpart P.

B. Scope.

This directive applies to all VOSH personnel.

C. Reference.

VOSH Standards for the Construction Industry Part 1926, Subpart P.

54 Federal Register 45894 (October 31, 1989).

52 Federal Register 12288 (April 15, 1987).

VOSH Program Directive 12-238; Amendment to the Excavations Standard.

VOSH Program Directive 02-203; Special Emphasis Program: Trenching & Excavation.

D. Cancellation.

Not Applicable.

E. Action.

The Assistant Commissioner, Directors, and Supervisors shall assure that employees understand the provisions of this Directive and comply with the policies and procedures contained in it.

F. Expiration Date.

Not Applicable.

G. Background.

Federal OSHA has been reviewing the existing standards for trenching and excavation since 1976. After years of study by the National Bureau of Standards, OSHA proposed a new standard in April of 1987. Following a period for public notice and comment, OSHA enacted a Final Rule on October 31, 1989.

This Final Rule was considered and adopted by the Virginia Safety & Health Codes Board on November 7, 1989, with a minor change to conform the standard with Virginia's Confined Space Standard § 1910.146. The Final Rule becomes effective in Virginia on March 5, 1990.

The Final Rule establishes one set of requirements applicable to all excavations, including trenches. A few provisions in the Rule apply only to those excavations which are also trenches.

H. Summary of Standard.

1. Effective Date

March 5, 1990.

2. Scope § 1926.650(a)

Applies to all open excavations, including trenches.

3. Definitions § 1926.650(b)

Most definitions in this section are clear, however, some require additional explanation:

a. "Competent Person"

A Competent Person is a designated person on site who satisfies both halves of the stated definition:

- is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, AND
- has the authority to take prompt corrective measures to eliminate such hazards or conditions.

For the purposes of this standard, competency is directly related to performance. The competency of the designated person will be assessed by adherence to the standard: whether the competent person performed all the general tasks that the standard requires of the competent person and,

where appropriate, made the proper determinations regarding soil types, sloping or benching, and protective devices.

See Appendix B for sample questions to ask to determine if the designated person is a "Competent Person."

Citation Guideline:

Generally, the CSHO should cite the specific standard requiring the judgment of a competent person, e.g. §1926.651(c)(1)(i), 1926.651(k), etc.

b. "Protective system"

A method of protecting employees from cave-ins, from material that could fall or roll from the excavation face or into an excavation, or from the collapse of adjacent structures. The term includes all systems and methods of protecting employees from these hazards, including support systems, sloping and benching systems, and shield systems.

c. "Ramp"

The term "ramp" includes both earthen and structural ramps. The sloped side of a trench or excavation, however, shall not be considered an earthen ramp unless the slope is designed to allow employees to walk the ramp in an upright manner when entering or exiting the trench.

d. "Shield [shield system]"

A shield is a structure which is capable of withstanding the force of a cave-in and thereby protecting employees within the structure. Shields generally do not prevent cave-in, but rather, protect employees from cave-ins that do occur. An expandable shield which can be adjusted to press against and support the walls of an excavation may also be considered a support system.

e. "Stable Rock"

Stable rock is natural solid mineral matter that can be excavated with vertical sides and will remain intact while exposed. Rock which contains visible fractures or seams, or rock (e.g. shale) which is interlayered with clay or soil materials, does not constitute stable rock.

f. "Support System"

A support system is a structure such as underpinning, bracing, or shoring which provides support to an adjacent structure, underground installation, or the sides of an

excavation. A support system is one type of protective system, and is more broadly defined than shield systems to include structures that support adjacent structures or underground installations.

4. General Requirements § 1926.651

(a) "Surface Encumbrances"

Surface encumbrances, including trees, boulders, etc., should be removed or supported where they could fall or collapse into the excavation or otherwise create a hazard to employees.

Citation Guideline:

This section will generally be cited as "serious."

(b) "Underground Installations"

This section requires employers, before beginning work, to determine the estimated locations of utility installations that may reasonably be encountered during the excavation.

(b)(2) requires employers to contact utilities and owners of the proposed work within established or customary local response times. Virginia's "Underground Utility Damage Prevention Act," Va. Code §§ 56.265.14 to 56.265.29, sets out the response time for notifications in this state, requiring that all persons performing excavation work notify the approved notification center (Miss Utility) of any project at least 48 hours before beginning work. [The Underground Utility Damage Prevention Act is attached as Appendix A.]

In addition, § (b)(2) allows employers to proceed with excavation, with caution, where utility companies cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is allowed by state law). CAVEAT: This provision is modified by Virginia law, which allows a utility 48 hours to mark the lines and prohibits persons from beginning any excavation prior to the marking of the utility lines until 3 hours after an additional notification to the utility. [See Appendix A, § 56-265.20.]

Citation Guideline:

If an employer fails to notify "Miss Utility", §(b)(2) should be cited "serious" if any underground utilities are located within 5 feet of the excavation. If there are no utilities within 5 feet, this section may be cited "other-than-serious."

An employer should not be allowed to proceed with excavation before the lines are marked unless the employer has followed both the requirements of this standard for proceeding "with caution" (by use of detection equipment) AND has complied with the additional notification requirement of the Virginia Underground Utility Damage Prevention Act.

§ 1926.651(b)(3) requires that the exact location of installations be determined when operations approach the estimated location.

.651(b)(4) requires installations to be protected, supported, or removed while the excavation is open.

Compliance Note:

The CSHO should also look for the presence of overhead transmission lines and determine whether the Overhead High Voltage Line Safety Act applies.

(c) "Access and Egress"

The standard allows the employer to choose any safe means of access or egress from an excavation, but if the employer chooses a structural ramp, built of steel or wood, (c)(1) sets out specific requirements the employer must meet:

(c)(1)(i) requires that structural ramps used solely for employee access and egress be designed by a competent person, but ramps designed for access and egress of equipment must be designed by a competent person qualified in structural design and must meet the design specification.

(c)(1)(ii)-(v) set out specific requirements for structural ramps and are self-explanatory.

Compliance Note:

This section applies only to ramps of steel and wood, not to earthen ramps. The Department, however, will not accept the sloped side of an excavation as safe access and egress unless the slope provides safe access for employees and equipment [see (3)(c) above]. The CSHO shall consider the degree of the slope, soil and environmental conditions, the depth of the excavation and other factors to determine if the ramp provides safe access.

An employer may not use knotted rope lines to assist employees using a slope as an earthen ramp.

VOSH does not consider lifting equipment as a safe means of access or egress. For example, employees may not ride the backhoe bucket to exit or enter an excavation.

Citation Guideline:

If NO safe means of access or egress is provided from an excavation, § 1926.450(a) should be cited "serious" for failure to provide either a ramp or a ladder for safe access. Section (c)(1) should be cited if the employer is using a structural ramp that does not comply with all of the technical requirements of this section. The violation may be cited "other-than- serious" if conditions warrant.

If the employer has properly designed a ramp, and conditions (e.g. rainfall) have rendered the ramp unsafe, cite § 1926.651(k) for the competent person's failure to inspect the ramp before allowing it to be used.

§ 1926.651(c)(2) sets out a specific requirement for trench excavations, and requires that trenches more than 4 feet deep have a safe means of access and egress located so as to require no more than 25 feet of lateral travel for employees.

Citation Guideline:

This section will generally be cited as "serious" where the employer has failed to provide safe access or egress for a trench, or where the safe means or access or egress is not located so as to require no more than 25 feet of travel. All measurements should be documented on the OSHA 1-B, and if possible, note that an employer representative on site observed and concurred in the measurement.

(d) "Exposure to Vehicular Traffic"

This section requires all employees exposed to public vehicular traffic to be provided with AND wear reflective garments.

Citation Guideline:

This section will generally be cited as "serious."

(e) "Exposure to falling loads"

This section prohibits all employees from working under loads (including both excavated material and slung loads) being lifted by lifting or digging equipment. The operator of the equipment performing the lifting is allowed to stay in the cab so long as the cab is equipped with a cab shield or canopy that complies with §1926.601(b)(6).

Citation Guideline:

This section will generally be cited as "serious."

(f) "Warning system for mobile equipment"

This section requires an employer to utilize a warning system, e.g. barricades, stop logs, observers, etc., where mobile equipment operators do not have a clear view of the edge of the excavation. The warning system only serves as a reminder to the operator; it does not need to be designed to prevent equipment from going over the edge. This requirement does not apply to equipment used to push spoils back into an excavation.

Citation Guideline:

This section will generally be cited as "serious."

Section (f) also includes the statement "if possible the grade should be away from the excavation." This statement is advisory only and should not be cited.

(g) "Hazardous atmospheres"

All excavations in Virginia are subject to the Confined Space Standard, § 1910.146 provided they

- are not intended for continuous employee occupancy,
- have a limited means of egress, and
- are subject to the accumulation of an actual or potentially hazardous atmosphere.

The confined space standard is more stringent than the requirements of § g. For confined spaces which meet the Virginia definition, compliance with the provisions of the Confined Space Standard will assure compliance with § g.

The only provision of the excavation standard which is more stringent than the Confined Space Standard is § (g)(2)(ii) which applies to employees entering bell-bottom pier holes. This provision requires employees to wear a life-line with a harness attached to it.

Citation Guideline:

Any violations regarding confined space entry should be cited with the appropriate provision of § 1910.146, grouped with the provision of § 1926.651(g).

(h) "Protection from hazards associated with water accumulation"

Section (h)(1) prevents employees from working in excavations where water is accumulating, unless precautions, such as dewatering equipment, safety lines, or special cave-in protections, are taken to protect employees from the hazard.

Section (h)(2) applies where the employer is using water removal equipment, and requires the competent person to monitor the equipment and its proper operation.

Section (h)(3) applies where an excavation crosses an area of natural drainage of surface waters and requires diversion ditches, dikes, or other means to prevent water from entering the excavation and to drain areas adjacent to the excavation.

Excavations subject to runoff from heavy rainfalls must be inspected by a competent person, and must comply with §§ (h)(1) and (h)(2).

Citation Guideline:

Where water has actually accumulated in an excavation and proper precautions have not been taken, this section may be cited as "serious."

(i) "Stability of adjacent structures"

Section (i)(1) requires support systems where an excavation endangers adjoining buildings, walls, or other structures.

Section (i)(2) applies where an excavation is dug below the footing or the base of a foundation or retaining wall, and prohibits such excavation unless:

- (i) a support system is provided to ensure stability of the structure and safety of the employees, OR
- (ii) the excavation is in solid rock [see 3(e)above], OR
- (iii) a registered professional engineer approves the determination that the structure is far enough away from the excavation to be unaffected, OR
- (iv) a registered professional engineer approves the determination that the excavation work will not present a hazard to employees (e.g. the excavation goes below a very small portion of a continuous concrete footing which can safely span the excavation).

Section (i)(3) prohibits the undermining of sidewalks, pavements, or appurtenant structures unless a support system has been provided to protect employees from the possible collapse of such structure. This provision protects not only employees in the excavation but also employees required to use the adjacent pavement or sidewalk area.

Citation Guideline:

Failure to provide an adequate support system under this section will generally be cited "serious."

(j) "Protection of employees from loose rock or soil"

Section (j)(1) protects employees from the hazard of loose rock or soil falling into an excavation, and requires an employer to provide adequate protection by scaling the excavation face, installing barricades, or other means.

Section (j)(2) requires that employees shall be protected from excavated or other materials or equipment that could fall or roll into the excavation. The section requires that all excavated materials AND all equipment be placed at least 2 feet from the edge of the excavation. The employer may also use retaining devices sufficient to prevent excavated material or equipment from falling or rolling into the excavation.

Compliance Note:

A retaining device will only be considered "sufficient" if it is capable of resisting any forces that may reasonably be expected to be imposed upon it. Where the weight of a superimposed load (e.g. a spoils pile) is located within 2 feet of the edge of an excavation, restraining devices are NOT sufficient to protect workers from the hazard of a cave-in and should not be used. If a 2-foot set back is not possible in this situation, the employer should remove the spoils from the site.

Citation Guideline:

Placement of excavated material or equipment within 2 feet of the edge of the excavation will generally be cited as a serious violation of (j)(2).

Where a retaining device would be sufficient to protect employees (i.e. where a superimposed load does not create an additional hazard), the employer should

be cited for failure to use a retaining device to prevent materials or equipment from falling into the excavation.

Citations for violations of (j)(1) will depend on the gravity of harm posed by the loose rock or soil falling into the excavation. This section may be cited where there is no possibility of a cave-in, but employees may be injured by smaller amounts of rock or soil.

(k) "Inspections"

Section (k)(1) requires daily inspections of excavations, adjacent areas, and protective systems by the competent person prior to the start of work, as needed throughout the work shift, and after every rainstorm or other hazard increasing occurrence. The inspections need only occur when employee exposure is anticipated.

The competent person must look for evidence of situations that could result in cave-ins, failures of protective systems, hazardous atmospheres, or other hazardous conditions.

Where the competent person finds such evidence, section (k)(2) requires him or her to remove employees from the hazardous area until the proper precautions have been taken.

Citation Guideline:

The CSHO should document whether the competent person has conducted the proper inspections. [see Appendix B for questions to ask a competent person.] This section will generally be cited as "serious" if grouped with another violation which might have been prevented by a proper inspection.

If the excavation is otherwise in compliance, but the competent person has not conducted daily inspections, this section may be cited "other-than-serious."

(l) "Fall protection"

Section (l)(1) requires standard guardrails on walkways or bridges used by employees to cross over excavations.

Section (l)(2) applies to remotely located excavations and requires adequate barrier physical protection.

Wells, pits, and shafts must be barricaded or covered. The section also requires all temporary wells, pits, and shafts dug during exploration or similar operations to be backfilled upon completion of the exploration.

Citation Guideline:

Falls of 10 feet or greater will generally be cited as "serious." Falls of less than 10 feet will be cited "other-than-serious" unless other hazards exist which increase the risk of injury to employees (e.g. a risk of impalement).

5. Requirements for Protective Systems § 1926.652

a. Protection of employees in excavations

Section a(1) requires that each employee in an excavation be protected from cave-in by either a sloping or benching system (§ 1926.652(b)) or a support, shield, or other protective system (§ 1926.652(c)). The only exceptions from this requirement are:

- i. excavations entirely in solid rock, OR
- ii. excavations less than 5 feet deep where examination by a competent person reveals no indication of a potential cave-in.

Citation Guideline:

Where there is no sloping or benching and no protective system in the excavation, this section should be cited "serious."

Where the trench is less than 5 feet deep, contains no sloping, benching, or protective system, and the competent person has not examined the ground for indication of a potential cave-in, this section may be cited either "serious" or "other-than-serious" depending on the circumstances.

Section a(2) sets out a general requirement that protective systems be designed to withstand all reasonably anticipated loads. Once the employer selects a protective system in accordance with § 1926.652(c), this section sets out the performance criteria the system must meet.

Compliance Note:

If the CSHO observes that a protective system appears inadequate or in danger of failure, the employer's representative or competent person shall be notified immediately and encouraged to remove all employees from the excavation until the danger of

failure has been abated.

Citation Guideline:

This section will generally be cited as "serious."

b. Design of the sloping and benching systems

If the employer chooses a sloping or benching system to protect employees, this section sets out 4 alternative methods of protection in increasing degree of complexity.

1. Option 1 - Allowable configurations and slopes

This section allows an employer to slope any excavation at an angle of 1 1/2:1 (34 degrees) OR to choose any configuration in Appendix B which is suitable for Type C soil.

Because these slopes and configurations are safe for the worst soil conditions, the employer does not need to conduct any soil analysis to use this option.

Citation Guideline:

This section should be cited where the employer elects to slope the excavation walls without soil analysis, but fails to slope the walls back on a 1 1/2:1 slope (34 degrees measured from the horizontal). This section may be cited either "serious" or "other-than-serious" depending on the degree of slope, the soil type, and other site-specific hazardous conditions.

2. Option 2 - Determination of slopes and configurations using Appendices A and B

This section requires an employer to classify the soil type(s) using Appendix A, then to choose the appropriate sloping or benching system for that soil type using Appendix B (see discussions of Appendix A and B below)

Citation Guideline:

This section should be cited where the employer elects to classify the soil and chooses an unsafe sloping or benching system for that soil type. This section will generally be cited as "serious" unless there is no risk of cave-in.

3. Option 3 - Designs using other tabulated data

This option allows an employer to use tabulated data,

such as charts and graphs, to design a sloping or benching system, so long as the data is in written form and includes:

- S identification of all parameters that affect the selection of a system,
- S identification of the limits of the data including the magnitude and configurations of slopes,
- S explanatory information necessary for the safe use and selection of a system.

A copy of the design must be kept on site while the slope is being constructed. After that time, it must be made available to VOSH on request.

Citation Guideline:

This section should be cited where the employer chooses a sloping or benching system using tabulated data. Where the employer chooses an unsafe sloping or benching system based upon the data, this section will generally be cited as "serious."

If the employer selects a safe sloping or benching system, but fails to meet technical requirements of this section, this section may be cited "other-than-serious" if no risk of death or serious physical harm is created by the omission.

4. Option 4 - Design by a registered professional engineer

This final option allows the employer to use a site-specific sloping or benching system approved by a registered professional engineer. The design must be in writing and include:

- the magnitude of the slopes,
- the configurations determined to be safe, and
- S the identity of the registered professional engineer approving the design.

A copy of the design must be on-site while the slope is being constructed. After that time, it must be made available to VOSH on request.

Under this option, the professional engineer may approve a design drawn up by a non-engineer. The employer has wide discretion to determine to degree of hazard and the level of protection. There are no

restrictions on the maximum allowable slopes or configurations that the engineer might approve. VOSH will rely upon the prudence, competence, and expertise of the engineer approving the design.

Citation Guideline:

This section should be cited where the employer elects to slope the excavation using a design approved by a registered professional engineer, but fails to follow the design. This section should also be cited where the design fails to meet the stated criteria. The violation may be cited either "serious" or "other-than-serious" depending upon the degree of harm.

VOSH will not cite where the engineer approves maximum slopes or configurations that do not comply with Appendix A and B, unless a cave-in has occurred or the design is plainly defective. In that case, a serious citation for § 1926.652(a)(2) should be issued.

- c. Design of the support systems, shield systems, and other protective systems.

This section requires an employer or his designee (usually a management representative on site) to select and construct protective systems in accordance with one of the following options:

1. Option 1 - Designs using appendices A, C, & D

This section requires an employer using timber shoring in trenches not exceeding 20 feet in depth to analyze the soil type using Appendix A, then to select the proper timber shoring configuration from the tables in Appendix C. [see discussion of Appendices A & C below].

Aluminum hydraulic shoring in trenches not exceeding 20 feet in depth should comply with § 1926.652(c)(2) unless manufacturers' tabulated data cannot be used. In that case, the employer must analyze the soil using Appendix A and choose a design in accordance with Appendix D. [see discussion of Appendices A & D below].

Citation Guideline:

This section will be cited where the employer has chosen to use timber or aluminum hydraulic shoring in accordance with this Option, but has failed to properly analyze the soil or has improperly installed the

shoring.

2. Option 2 - Designs using Manufacturers' Tabulated Data

This option allows the employer to use manufactured protective systems such as metal hydraulic shoring or shields. The section requires that the design of protective systems drawn from manufacturer's tabulated data be in accordance with all of the manufacturer's specifications, recommendations, and limitations. Any deviations require the manufacturer's written approval.

Under this option, the employer is allowed some discretion in choosing a manufactured product for use, but the product selected must be appropriate for the site conditions. For this reason, all specifications, recommendations, and limitations, as well as any approved deviations, be in writing and on site during construction of the system. After construction, the data must be made available to VOSH on request.

Compliance Note:

Where an employer is using older manufactured systems (other than aluminum hydraulic shoring in trenches) for which manufacturer's tabulated data is no longer available, the employer should use Option 4 below.

Citation Guideline:

This section will be cited where the employer has chosen to use manufactured protective systems and either fails to have manufacturer's tabulated data on site, or fails to follow the manufacturer's specifications, recommendations, or limitations.

3. Option 3 - Designs using other tabulated data

This option allows repetitive use of general designs for protective systems, so long as those designs are selected in accordance with tabulated data, such as charts or graphs, that have been approved by a registered professional engineer. Such general designs have limits which cannot be exceeded, thus the tabulated data must be in written form and set out:

S the parameters that affect the selection of the proper protective system,

- the limits on use of the data, and

S explanatory information to allow the user to make

a correct selection of a protective system from the data.

The tabulated data must identify the registered professional engineer who approved the data and must be maintained on the site while the protective system is constructed. After that time, the data must be made available to VOSH on request.

Citation Guideline:

This section will be cited where the employer has chosen to use general designs for protective systems, and either fails to have tabulated data on site, or fails to select the proper protective system following the parameters or limitations of that data.

4. Option 4- Design by a registered professional engineer

This section allows an employer to use other protective systems which have been approved by a registered professional engineer. Under this option, the employer can design a protective system for unique applications and will not be bound by specific restrictions or limitations. The registered professional engineer has the latitude to determine the degree of hazard and the appropriate level of protection.

The design of the protective system must be in writing and include:

- S a plan indicating the sizes, types, and configurations of the materials to be used in the protective system, and
- S the identity of the professional engineer approving the design.

As with the other options, the design must be maintained on the site while the protective system is constructed. After that time, the design must be made available to VOSH on request.

If the employer is using older manufactured protective systems for which no tabulated data is available to comply with Option 2, the employer must have the system approved by a registered professional engineer in accordance with this Option. A letter from the engineer describing the design of the particular protective system, including its size, type, and material from which constructed, and any limitations on the system's usage will satisfy the requirements of this section.

Citation Guideline:

This section will be cited where the employer has chosen to use a professional engineer-approved design for a protective system, and either fails to have the design on site, or fails to construct the system in accordance with the design. This section should also be cited where the design fails to meet the stated criteria. The violation may be cited either "serious" or "other-than-serious" depending upon the circumstances.

VOSH will not cite where the engineer approves a design that does not comply with other provisions of § 1926.652(c) or the Appendices, unless a cave-in has occurred or the design is plainly defective. In that case, a serious citation for § 1926.652(a)(2) should be issued.

This section will also be cited where an employer is using older manufactured protective systems for which tabulated data is unavailable and which has not been approved for use by a registered professional engineer. If the system has visible defects, is inadequately braced, or is not structurally sound, the employer should be cited for a serious violation of § 1926.652(a)(2) [protective systems], grouped with a violation of § 1926.652(c)(4) for failure to have the system approved by an engineer.

If the system has no visible defects, the employer should be cited for an "other-than-serious" violation of §1926.652(c)(4) for failure to have the system approved by a registered professional engineer. The employer must either remove the system from service or have the system approved by the abatement date and send a copy of the approval to VOSH. The employer should be instructed that failure to send the engineer's approval to VOSH or remove the system from service may result in a failure-to-abate citation and penalties.

d. **Materials and equipment**

Section (d)(1) is a general requirement that all materials and equipment used in protective systems be free from damage and defects.

Section (d)(2) requires that manufactured materials and equipment be used and maintained in a safe manner and in accordance with the manufacturer's recommendations.

The final section, (d)(3), requires the competent person to inspect any damaged materials or equipment and evaluate its suitability for continued use. Where damage is extensive, or the competent person cannot assure the safe use of the system, the material or equipment must be removed from service and evaluated by a registered professional engineer.

Citation Guideline:

Where failure of the damaged material or equipment could result in a cave-in or other serious hazard to employees, this section should be cited "serious."

e. Installation and removal of support

1. General

This section sets out general provisions for the installation and removal of support systems:

- i. members shall be securely connected together,
- ii. support systems shall be installed and removed in a manner that protects employees,
- iii. individual members shall not be subjected to excessive loads,
- iv. before temporary removal of individual members, additional precautions must be taken,
- v. removal of the system must begin at the bottom and progress upward, and
- vi. backfilling must progress with the removal of support systems.

8. Additional requirements for support systems for trench excavations

Section (e)(2)(i) applies only to trenches and allows an employer to excavate a trench to a level not more than 2 feet below the bottom of a support system, provided the system is designed to be fully effective in resisting the forces calculated for the full depth of the trench AND there is no indication of a loss of soil either behind or below the support system.

An employer who wishes to excavate deeper than 2 feet below the bottom of the support system must comply with § 1926.652(c)(4) and use a design approved by a registered professional engineer.

Section (e)(2)(ii) is a general requirement that the installation of support systems be closely coordinated with the excavation of the trench.

Citation Guideline:

Citation of these provisions as "serious" or "other-than-serious" will depend on the circumstances present on site.

f. Sloping and benching systems

This section prohibits employees from working on faces of sloped or benched excavations at levels above other employees, unless the employees at the lower level are protected from the hazards of falling, rolling, or sliding material or equipment.

Citation Guideline:

Citation of these provisions as "serious" or "other-than-serious" will depend on the circumstances present on site.

g. Shield systems

1. General

This section sets out general work practices for shield systems, including:

- i. Systems shall not be subjected to loads exceeding their design capacity,
- ii. Shields shall be installed to restrict lateral or other hazardous movement in the event of a sudden lateral load,
- iii. Employees shall be protected from cave-in while entering or exiting the shield, and
- iv. Employees are not allowed inside the shield when it is being installed and when it is being moved vertically.[Employees may remain inside the shield when it is being moved horizontally.]

2. Additional requirements for shield systems used in trench excavations

Section (g)(2) applies only to trenches and allows an employer to excavate a trench to a level not more than 2 feet below the bottom of a shield, provided the shield is designed to be fully effective in resisting the forces calculated for the full depth of the trench AND there is no indication of a loss of soil either behind or below the shield.

Citation Guideline:

Citation of these provisions as "serious" or "other-than-serious" will depend on the circumstances present on site.

6. Appendix A : Soil Classification

Appendix A sets out a non-technical method of soil analysis based on a simple, conservative soil classification system.

The Appendix is **MANDATORY** for several of the options detailed in § 1926.652 and may be useful or necessary for other options where the use of tabulated data is predicated upon a soil analysis. The application of this appendix is summarized in the following table:

The Appendix sets out a hierarchy for soil classification:

Stable Rock
Type A Soil
Type B Soil
Type C Soil

Where this Appendix is mandatory, the competent person on site must classify each soil or rock deposit in the excavation using at least one manual and one visual analysis. The employer is not limited to the classification methods set out in this Appendix and may use other recognized methods of soil classification and testing. Once the competent person has determined the soil type, the proper protective system can be selected. The competent person must classify each layer in a layered system and chose a protective system appropriate to the weakest layer. Note that the competent person may have to reclassify soils in the event of a heavy rainstorm or other hazard-increasing occurrence.

Compliance Note:

Where the employer has used this Appendix, the CSHO must conduct an independent analysis of the soil types to determine if the Appendix was used correctly and the proper sloping, benching, or protective system was chosen. The attached checklist may be used by the CSHO to verify the soil type(s). [Checklist A is a short version to be used when the CSHO becomes familiar with the requirements of this Appendix. Checklist B is a long form that sets out the Appendix' requirements verbatim and should be used until the CSHO is comfortable with the soil classification system.]

Two of the manual tests, the drying test and tests using a pocket

penetrometer or a sheervane, need not be duplicated by the CSHO. If the employer has relied upon either of these tests, the CSHO should verify the employer's results by use of the other manual tests (plasticity, dry strength, and/or thumb penetration.)

7. Appendix B: Sloping and Benching

This Appendix is mandatory when the employer chooses Option 2 of § 1926.652(b) and elects to classify the soil using Appendix A and choose a sloping or benching system from this Appendix.

The slopes in this Appendix are the maximum allowable slopes for each type of soil, i.e., the steepest incline allowed for the particular soil. See Table B-1.

The only exception to the maximum allowable slopes in Table B-1 is for short-term (less than 24 hours) excavations in Type A soil where the excavation is 12 feet or less in depth. The slope for such a short-term excavation can be 1/2:1, rather than 3/4:1.

8. Appendix C: Timber Shoring for Trenches

This Appendix is mandatory when an employer uses timber shoring in a trench 20 feet or less in depth in accordance with Option 1 of § 1926.652(c). The employer must first classify the soil using Appendix A, then must select the proper configuration from the tables in this Appendix.

9. Appendix D: Aluminum Hydraulic Shoring for Trenches

This Appendix is mandatory when an employer uses aluminum hydraulic shoring in a trench 20 feet or less in depth in accordance with Option 1 of § 1926.652(c). This option is only used when the employer cannot utilize manufacturer's tabulated data in accordance with Option 2 of § 1926.652(c).

The employer must first classify the soil using Appendix A, then must select the proper configuration from the tables in this Appendix.

I. Procedures For Obtaining Agency Interpretations.

All outside requests for interpretations of the Excavations Standard shall be referred to the Occupational Safety Enforcement Director. Draft interpretations shall be developed by the Safety Enforcement Director and circulated for concurrence to the other Directors, Assistant Commissioner and Commissioner (if deemed necessary).

The interpretation shall be drafted for signature by the Commissioner and added to this manual upon issuance. The Federal Liaison and Technical Support Director shall assure that the interpretations in this manual remain current.

Interpretations issued will be published in the Virginia Register by the Federal Liaison and Technical Support Director.

Carol Amato
Commissioner

Attachment: **Appendix A: Soil Analysis Checklist A***

 Appendix B: Soil Analysis Checklist B*

 Appendix C: Competent Person Interview Statement*

 *** available upon request as a hard copy only**

Distribution: Commissioner of Labor and Industry
 Assistant Commissioner for Enforcement
 Assistant Commissioner for Training and Public Services
 Director of Internal Audit and Technical Support
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 OSHA Regional Administrator, Region III